REMARKS

Reconsideration of the application in view of the above amendments and the following remarks is respectfully requested.

Claims 1-150 are pending in this application. Claims 40-150 have been canceled without prejudice. Claims 2-4, 7, 9, and 12 have been amended.

Claims 2-4 and 12 have been objected to, as liquid crystal and liquid crystal material have been used interchangably in the claims. The claims 2-4 and 12 have been amended to replace all such occurrences of without "material" to include the material. Claims 7 and 9 have been amended to correct typographical errors. The above amendments to the claims have not been made to avoid prior art, and are unsubstantial.

The office action states that Claims 1-3,5-6,8-9,11-12, 24-25 are rejected under Section 35 U.S.C. 102(b) as being anticipated by Clapp (US 6424755).

Clapp does not mention or suggest a waveguide switching element. The word "switch" does not appear in the specification or claims. Clapp's invention has rather to do with controlling the *phase* of light propagating down a waveguide.

Examiner appears to have confused two sections of Clapp. In the first section, Clapp notes

> "The slot 36 is filled with a suitable dielectric material possessing a thermo-optic coefficient whose modulus is large compared with that of silica. One particular example of a suitable material is a low elastic modulus silicone gel also found suitable for use as a damage preventing index matching compound interposed between the opposed ends of optical fibres in abutting type fibre connectors."

Clapp then states that the low elastic modulus silicone gel can be used as a phase changing elemnt of the waveguide, since the index of refraction changes with temperature.

Clapp then states

> "The or each slot 36 is filled with a material possessing a large electro-optic coefficient, for instance a polymer dispersed liquid crystal. Such a material can be made to have a sub-micron sized dispersion. By changing the relative potentials applied to

PAGE 9/12 * RCVD AT 12/20/2005 1:49:47 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/39 * DNIS:2738300 * CSID:9147624126 * DURATION (mm-ss):03-42

the four electrodes of a slot, the molecular axis of the material in the slot can be adjusted by the fringing fields generated by those potentials from an orientation in which the refractive index that the material presents to light propagating in the waveguide axial direction is at a maximum to an orientation in which the refractive index presented is at a minimum."

Since the liquid crystal material has a larger refractive index variation than low elastic modulus silicone gel, and hence can effect a larger phase change in the light propagating in the waveguide.

Clapp nowhere states that the refractive index of the liquid crystal material matches that of the waveguide. In fact, Clapp explicitly recognizes that the index is different, as he states that:

"Typically the slots 36 of FIGS. 3 and 4 will extend perpendicularly with respect to their waveguide axes but, if this orientation presents an unacceptably large back reflection amplitude, the slots can be aligned obliquely with respect to the waveguide axis."

A reflection would only occur if there were a difference in the refractive index.

Clapp does not mention or suggest a waveguide "wherein the index of refraction of the liquid crystal material in the first state matches the index of refraction of the at least one planar wave guide"

Clapp's entire specification deals with the changing index to change the phase of the transmitted light in the waveguide.

Clapp nowhere states that the liquid crystal material matches the index of refraction of the waveguide. Clapp's figure 1 deals with the loss in transmission across a shorter or longer gap in the waveguide, with two choices of index of refraction... 1 (which must be an air gap, and 1.55 chosen for some reason not given in the specification. Clapp has silica (index 1.49) as cladding material. Equation 1 makes no mention whatsoever of the index of the core, and has no contribution for the reflectivity of the light at the core- gap interface. Since there is a 4% loss at each glass air interface, fig. 1 is grossly misleading in showing loss only due to the wave spreading for the case of $n = 1$. In fact, Clapp does not discuss reflection at all except for the

PAGE 10/12 * RCVD AT 12/20/2005 1:49:47 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/39 * DNIS:2738300 * CSID:9147624126 * DURATION (mm-ss):03-42

sentence:

"Typically the slots 36 of FIGS. 3 and 4 will extend perpendicularly with respect to their waveguide axes but, if this orientation presents an unacceptably large back reflection amplitude, the slots can be aligned obliquely with respect to the waveguide axis. Under these circumstances it may be necessary to offset each waveguide section with respect to its immediate neighbours to take due account of refraction effects at the slot walls."

Thus, Clapp does not mention or suggest

"wherein a beam of light in any polarization propagating in the wave guide is not reflected when the beam of light in any polarization reaches the liquid crystal material in the first state, and wherein the beam of light in any polarization is reflected when the liquid crystal material is in the second state."

Examiner errs in stating that Clapp mentions or suggests the liquid crystal material in an *isotropic* or *nematic* state. The two words are not to be found by computer search of the USPTO document file.

Examiner errs in stating that Clapp describes a beam of *any* polarization. The word "polarization" is not to be found by computer search of the USPTO document file. The light traverses the interface between the waveguide and the liquid crystal material normally or nearly normally, and hence the polarization of the light is quite irrelevant to Clapp, and is never mentioned or suggested.

Since Clapp does not mention or suggest a number of elements of claims 1 and 24, independent claims 1 and 24 are patentable under Section 35 U.S.C. 102(b) .

The office action states that Claims 1, 4-10, 13-14, 17-18, 20-22, 23-24, 29, 32-35, 37, and 39 are rejected under Section 35 U.S.C. 103(a) as being unpatentable over Clapp (US 6424755) in view of Leslie (6559921).

Clapp, for the reasons cited above, does not mention or suggest numerous elements of the claims. Clapp and Leslie are also in different arts. Clapp merely changes phase of light

PAGE 11/12 * RCVD AT 12/20/2005 1:49:47 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/39 * DNIS:2738300 * CSID:9147624126 * DURATION (mm-ss):03-42

propagating in a planar waveguide. Leslie reflects or transmits light in a planar waveguide into one of two other waveguides. Clapp does not mention polarization, Leslie *requires* it. Thus, there would be no reason for one skilled in the art to combine the teachings of Leslie and Clapp.

Since neither Leslie nor Clap mentions or suggests:

"wherein a beam of light in any polarization propagating in the wave guide is not reflected when the beam of light in any polarization reaches the liquid crystal material in the first state, and wherein the beam of light in any polarization is reflected when the liquid crystal material is in the second state."

Claims 1, 4010, 13-14, 17-18, 20-22, 23-24, 29, 32-35, 37, and 39 are patentable under Section 35 U.S.C. 103(a) over Clapp (US 6424755) in view of Leslie (6559921)

An extension of time for filing a reply in the above identified application from Dec. 9, 2005 to Jan. 9, 2006 is respectfully requested under 37 CFR 1.17. An additional fee of $60 is required.

The required fees and any insufficiency or overage (except issue fees) may be debited or credited to deposit account 08/2240.

On the basis of the above amendments and remarks, reconsideration of this application and its early allowance is respectfully requested.

CERTIFICATE OF FACSIMILE TRANSMISSION UNDER 37 CFR 1.8(a) and (b), 37 CFR 1.86(f)-

I hereby certify that the following attached correspondence comprising Response and Amendment is being sent by facsimile transmission to Commissioner of Patents Alexandria, VA 22313-1450 FAX NUMBER 571-273-1800 on December 20, 2005

Respectfully,

R Hodgson

822 Pinesbridge Road, Ossining, NY 10562.

914-914-302-6503 (Fax 914-762-4126)

Rodney T. Hodgson Agent # 37,849

E-MAIL - patents@aip.org

BEST AVAILABLE COPY

PAGE 12/12 * RCVD AT 12/20/2005 1:49:47 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/39 * DNIS:2738300 * CSID:9147624126 * DURATION (mm-ss):03-42